FOR CONTRACT NO.: 07-002344

INFORMATION HANDOUT

FINAL FOUNDATION REPORT FOR SOUND WALL 1190 & 1191

PS&E HAZARDOUS WASTE ASSESSMENT

ROUTE: 07-LA-710-PM 22.6

State of California — Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: **Ms. Traci Menard**
Chief, Bridge Design Branch 15
Office of Bridge Design South-1

Attn: Mr. Fred Feng

Date: April 19, 2010
File: 07-LA-710, PM 22.5/22.7
EA: 07-002341
Retaining Walls 1190 & 1191
53- E 0136 & 53- E 0137

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design South 1
Branch B

Subject: Final Foundation Report (FR) For Walls 1190 & 1191 @ the Washington Blvd. Ramps and LA-710.

Per your request dated October 09, 2008, a Foundation Report (FR) has been prepared for Sound and Retaining walls 1190 and 1191, associated with the proposed widening of the LA-710 ramps at Washington Blvd. Two versions of this FR were submitted to your office on May 15, 2009 and December 01,2009.

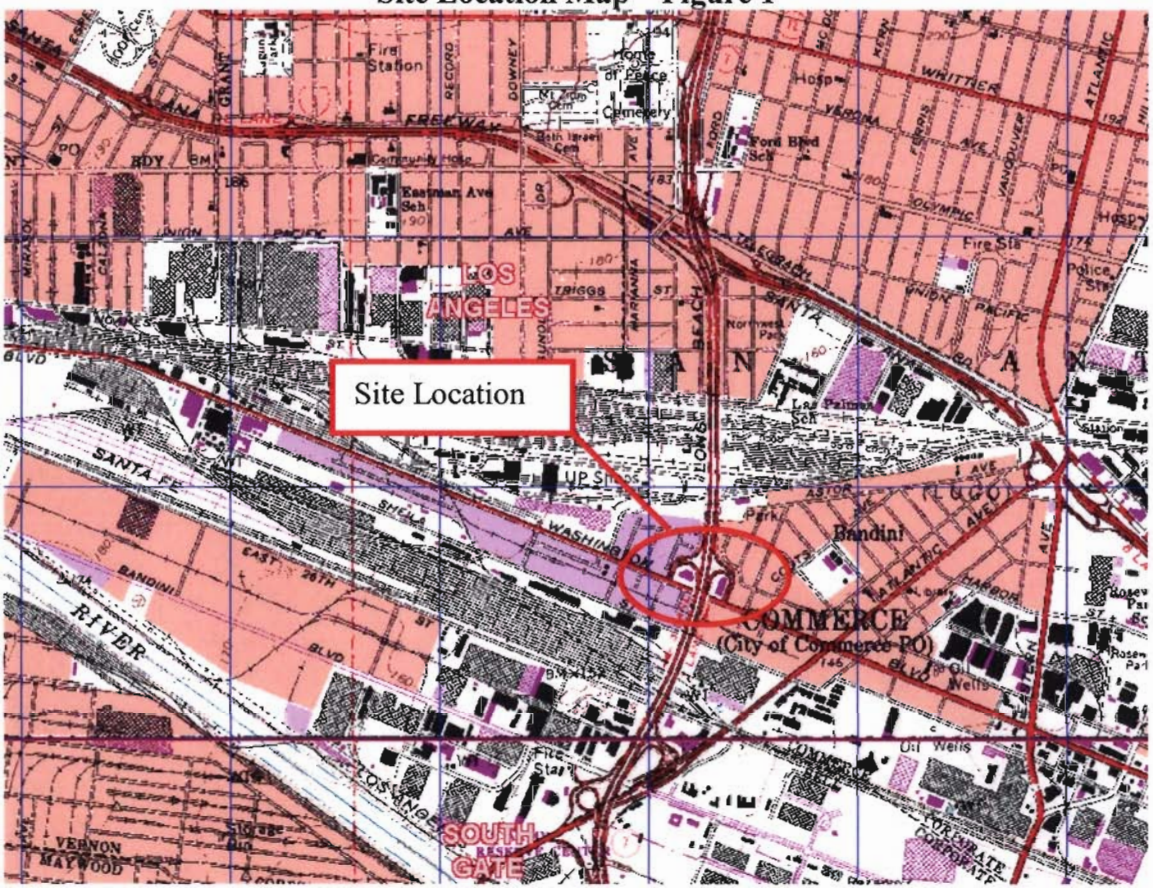
This Report contains amendments to the Cast-In-Drilled-Hole (CIDH) piles loadings to be constructed on either side of the Pedestrian Undercrossing (PUC). An additional tieback wall system is proposed to resist all lateral design loading as a result of the fill placement above the PUC, which will rest on the CIDH piles.

Changes to the alignment of wall 1190 involve additional widening to the originally proposed plan and shortening of the sound wall along the end of the off ramp. The realignment begins from approximately Sta. 292+50 and extends north to the end of the wall. With the exception of Crash Cushion placement in front of wall 1191, this wall remains essentially unchanged.

This FR includes recommendations for design and construction of 30-inch diameter CIDH Piles, where the soundwall bridges over the Pedestrian Undercrossing (PUC). General Layout and Typical Cross Sections Plans are included in Appendix A. A Site Location Map is shown on the next page in Figure 1.

The information in this report is based on review of the original geotechnical reports and Logs of Test Borings (LOTB) for Washington Blvd Undercrossing (53-0841) as well as Leonis Street Pedestrian Undercrossing (53-0990) & Storm Drain dated April 26, 1954. The recommendations in this FR are also based on findings obtained from a Geotechnical Investigation and associated laboratory testing implemented at areas within close vicinity of the proposed ramp expansions. Structure Design provided Layout Sheets on March 25, 2010, which contained the latest layouts for the proposed walls, including bottom of footing elevations. District-7 Project Design overlayed the Topographic Contours over the mapped wall alignment to assist in settlement calculations. The plans are presented in Appendix A.

Site Location Map – Figure 1



1.0 PROJECT DESCRIPTION

1.1 Existing Structures

The 710 segment within the project vicinity is placed on a fill embankment that was completed during the mid to late 50s. The project is bounded by the East Yard Overhead (OH) Bridge (53-0842) on the north, and by the Washington Blvd Undercrossing (UC) (53-0841) on the south, in the City of Commerce. According to As-Built plans, approximate fill depths are 30 feet along the East Yard OH and 20 feet at the Washington Blvd UC.

The project proposes modification of two (2) ramps at the subject intersection, 1- The southbound 710 Washington Blvd Off-Ramp and 2- The northbound 710 Washington Blvd On-Ramp. These ramps are constructed on fills approximately 25 feet deep at the 710-roadway level and taper down to meet existing Washington street grade elevation. According to As-Built plans, the slopes along the ramps are constructed at approximately a 2:1 (H:V) ratio, and were vegetated at the time of our investigation. A pedestrian Undercrossing (Leonis St. PUC) crosses under the 710 within the project limits, and is positioned along the northern portions of the project. Underground water and sewer utilities are also positioned along the PUC.

1.2 Proposed Structures

The project is located on Route 710 from Washington Boulevard to 0.4 km north of Washington Boulevard in the City of Commerce (KP 36.2/36.5, PM 22.5/22.7). The project proposes to construct 1,743 ft. of soundwalls along the edge of the shoulder at the Route 710 northbound on-ramp and southbound off-ramp at Washington Blvd. The soundwalls are 1,110 ft. along the northbound on-ramp and 633 ft. along the southbound off-ramp. The height of the soundwalls is 12 feet for both retaining walls. The walls are placed on native original ground and on existing fill embankment side slopes. 30-inch CIDH piles are proposed where the sound wall is bridged over the PUC. The soundwalls will be placed on retaining walls (Type 1SWB) and/or standard CIDH piles (736S/SV) Barrier, as summarized in Table 2 below.

Table 2 - Proposed Wall Summary

Wall	Location (Station)	Foundation Type	Bottom of Footing Elevation (Feet)	Retaining wall Height (Feet)	Width of Footing (Feet)	Required Ultimate Bearing Capacity (KSF)
1190	288+37.16 to 289+27.16	736 S / SV	N/A	N/A	N/A	N/A
1190	289+27.16 to 289+70.00	1 SWB	154.50	8	8.00	5.6
1190	289+70.00 to 290+10.00	1 SWB	154.50	10	8.75	6.1
1190	290+10 to 290+40	1 SWB	154.50	12	9.75	6.6
1190	290+40 to 290+60	1 SWB	154.50	14	10.75	7.3
1190	290+60 to 290+90	1 SWB	154.50	16	12.00	8.1
1190	290+90 to 291+20	1 SWB	154.50	18	13.00	9.0
1190	291+20 to 291+60	1 SWB	154.50	20	14.25	9.9
1190	291+60 to 292+25	1 SWB	154.50	22	15.25	11.3
1190	292+25 to 292+40	1 SWB	154.50	24	16.50	12.2
1190	292+40 to 292+80	1 SWB	156.50	22	15.25	11.3
1190	292+80 to 293+10	1 SWB	158.50	22	15.25	11.3
1190	293+10 to 293+49.4	1 SWB	160.50	20	14.25	9.9
1190	293+49.4 to 293+80.9	Tieback Wall	N/A	N/A	N/A	N/A
1190	293+80.9 to 294+30	1 SWB	164.00	20	14.25	9.9
1190	294+30 to 294+70	1 SWB	166.00	18	13.00	9.0
1190	294+70 to 294+90	1 SWB	166.00	20	14.25	9.9
1190	294+90 to 295+40	1 SWB	168.00	18	13.00	9.0
1190	295+40 to 295+90	1 SWB	170.00	18	13.00	9.0
1190	295+90 to 296+30.3	1 SWB	172.00	18	13.00	9.0
1191	185+17.1 to 189+80	736 S / SV	N/A	N/A	N/A	N/A
1191	189+80 to 190+40	1 SWB	161.0	10	8.75	6.1
1191	190+40 to 190+60	1 SWB	158	14	10.75	7.3
1191	190+60 to 190+90	1 SWB	158	16	12.0	8.1
1191	190+90 to 191+10	1 SWB	158	18	13.0	9.0
1191	191+10 to 191+30	1 SWB	156.5	20	14.25	9.9
1191	191+30 to 191+80	1 SWB	156.5	22	15.25	11.3
1191	191+80 to 192+20	1 SWB	156.5	24	16.50	12.2
1191	192+20 to 192+40	1 SWB	157.5	24	16.50	12.2
1191	192+40 to 192+70	1 SWB	159.5	22	15.25	11.3

Wall	Location (Station)	Foundation Type	Bottom of Footing Elevation (Feet)	Retaining wall Height (Feet)	Width of Footing (Feet)	Required Ultimate Bearing Capacity (KSF)
1191	192+70 to 193+00	1 SWB	161.5	20	14.25	9.9
1191	193+00 to 193+47.713	1 SWB	164.0	20	14.25	9.9
1191	193+47.713 to 193+79.047	Tieback Wall	N/A	N/A	N/A	N/A
1191	193+79.047 to 194+30	1 SWB	169.00	18	13.0	9.0
1191	194+30 to 195+00	1 SWB	170.5	18	13.0	9.0
1191	195+00 to 195+40	1 SWB	170.5	20	14.25	9.9
1191	195+40 to 195+80	1 SWB	172.5	18	13.0	9.0
1191	195+80 to 196+27.29	1 SWB	172.5	20	14.25	9.9

The proposed Soundwalls over retaining wall provide additional roadway capacity by widening the ramps, and provides noise level reduction to nearby residences. Wall layouts are included in Appendix A.

2.0 FIELD EXPLORATION PROGRAM

A geotechnical investigation took place on November 18 & 19, 2008. The conducted investigation consisted of drilling seven (7) hollow-stem auger borings (A-08-001 through A-08-007) advanced to depths between 26.5 and 66.5 feet below ramp grades. The investigation was conducted using a CME 85 drill rig under the supervision of an OGDS-1 Geotechnical Engineer. The borings are located within the existing ramp right of way. The approximate locations are shown on the attached layout plans (see Appendix A).

Three (3) borings were drilled specifically for Wall Number 1190 and proposed CIDH piles associated with the PUC (borings A-08-001 through A-08-003). The remaining four (4) borings were drilled for the proposed Retaining Wall 1191 (A-08-004 through A-08-007).

Listed below is a summary of boring data with locations and elevations.

Table 3 – Summary of Borings

Boring	Station (Note 1)	Offset (Note 1)	Surface Elevation, (ft.)	Drilled Depth, (ft.)	Bottom Elevation, (ft.)
A-08-001	64+47.88	-9.03	162.73	36.5	126.23
A-08-002	91+57.61	6.05	177.24	66.5	110.74
A-08-003	94+45.89	-3.75	186.06	51.5	134.56
A-08-004	62+75.01	11.15	155.38	26.5	128.88
A-08-005	65+47.48	16.56	168.04	36.5	131.54
A-08-006	91+21.74	-5.36	178.56	46.5	132.06
A-08-007	1249+03.36 [3]	65.72	188.18	56.5	131.68

Note: 1. Stationing and Offsets according to D-7 survey request # 08-290, dated 1/14/09. Positive is right of layout lines, negative is left of Layout line lines. Off and On-ramp stationing, see plans.

2. Elevations are above Mean Sea Level (MSL).

3. Rte.710 Main line stationing.

Stations, offsets, and elevations of the borings were surveyed by a District 7 Surveys Crew and provided on 1/15/2009.

Soil samples were logged and sampled using a Standard Penetration Test (SPT) sampler and a California sampler alternating at typically 5-foot intervals. The SPT samples were driven using a 140-pound hammer falling freely for 30 inches for a total penetration of 18 inches. The modified California Sampler is a 2.0-inch inside-diameter sampler, which retrieves undisturbed samples. At the completion of the borings the holes were backfilled with native soil and bentonite cement mix, and were patched with AC patch at the surface.

3.0 LABORATORY TESTING

Laboratory testing was performed by Caltrans District and Headquarters Laboratories on selected SPT, undisturbed, and bulk samples retrieved from the borings. Laboratory testing included in-situ dry density, moisture content, mechanical analysis, Atterberg limits, direct shear, unconfined compression, consolidation, and corrosivity. Geotechnical testing was performed in accordance with California Test Methods and/or ASTM procedures (see Table 4 below). Corrosivity testing was performed in accordance with Caltrans Test Method (CTM) 643. Refer to Section 7.0 for a discussion of the corrosivity results. A summary of the geotechnical laboratory results is presented in Appendix C .

Table 4 – Laboratory Test Methods

Test	Standard
In-Situ Dry Density	CTM 226
Moisture Content	CTM 212
Atterberg limits	CTM 204
Direct Shear	ASTM D3080
Mechanical Analysis of Soils	CTM 201, 202, 203
Corrosion – Resistivity / pH.	CTM 643
Unconfined Compression	CTM 221
Consolidation	D-2435

4.0 GEOLOGY

4.1 Regional Geology

The project lies within the Peninsular Range Geomorphic Province. The Peninsular Ranges Province is characterized by northwest to southeast trending mountain ranges and faults, which are parallel to and related to the San Andreas Fault.

The site is located roughly in the center of the Los Angeles Basin. The Los Angeles Basin is filled by deposits of alluvial sediment derived from the surrounding hills and mountains. The alluvial sediments are underlain by a thick sequence of primarily Neogene, marine sediments that overlie Mesozoic, crystalline, basement rocks at great depth.

4.2 Site Geology

The site is underlain by alluvium derived from the nearby mountains. The alluvium is composed of silty clays, silty sands, and sands. Densities range from medium dense to dense and increase with depth.

5.0 SUBSURFACE CONDITIONS

According to survey data obtained for this project, approximate elevations for the top of the borings range between 162.73 and 186.06 feet MSL for wall 1190, and between 155.38 and 188.18 for wall 1191. The deepest drilled depth of the borings was to an elevation of about 110.7 feet MSL (Boring A-08-002).

According to the boring data, **artificial fills** consisting of silty and clayey sands with clays and silts generally underlie the proposed sound and retaining walls. The dry density of the fill varies between 104 and 125 ponds per cubic foot (PCF) while the moisture contents vary between 7 and 17 %. Gravels larger ½ inch may be present at depths between 10 to 20 feet below the surface.

The fill is underlain by **alluvial materials** consisting of silty, clayey and poorly graded sands (SM, SC and SP) including clays and silts. The dry density of the alluvium varied between 92 and 127 pounds per cubic foot (PCF), while moisture contents varied between 4 and 19 %. Gravels larger ½ inch may be present predominantly at depths beyond 15 feet below the original ground surface.

No ground water records exist in the Department of Water Resources website near the subject site. The previous investigations for the pedestrian overcrossing and Washington Blvd. Undercrossing in 1954 did not encounter groundwater to an elevation of approximately 110 feet above mean sea level (MSL). The deepest boring drilled during our current geotechnical investigation, was advanced to an approximate elevation of 108 feet MSL, and no ground water was encountered.

6.0 SEISMICITY

The controlling seismic source for this project is the Puente Hills Blind Thrust (PHBT) Fault. Note that this fault is considered active for bridge design based on the information included in the California Geological Survey's (CGS) 2002 fault database. It was not included in the Caltrans 1996 California Seismic Hazard Map (CSHM) and replaces the Elysian Park Seismic Zone (EPK). Caltrans has assigned a Maximum Credible Earthquake (MCE) of moment magnitude 7.25 to this fault. This is a buried thrust fault with a site-to-rupture surface distance of about 5.5 to 5.9 km from the project limits. Based on the Sadigh et al (1997) attenuation relationships, the median *Peak* Bedrock Acceleration (PBA) at the site is estimated to be about 0.6g. For geotechnical design, the design Peak Ground Acceleration (PGA) at the site should be taken as 0.55g. The site-to-rupture surface distance for Upper Elysian Park Blind Thrust fault is about 6.7 to 7.7 km from the project limits. Caltrans also considers this fault as active for bridge design based on the CGS's 2002 fault database and assigned a MCE of 7.0. Note that based on these data, this fault is also capable of generating a design PBA on the same order of magnitude as the PHBT fault.

As of this time, Caltrans has no policy in place regarding seismic requirements for walls, however and based on your request, we recommend a lateral acceleration seismic coefficient Kh =1/3 (PGA) and a vertical component Kv = 0

6.1 Liquefaction Evaluation

Liquefaction is a phenomenon in which loose, saturated, fine-grained, granular soils behave like a liquid while being subjected to high-intensity ground shaking. Liquefaction occurs when shallow ground water, low-density, fine, sandy soils and high-intensity ground motion exist at a site. Saturated, loose to medium dense, near-surface, cohesionless soils exhibit the highest liquefaction potential, while dense, cohesionless soils and cohesive soils exhibit low to negligible liquefaction potential.

As previously mentioned in section 6.0, ground water was not encountered during our recent exploration program, advanced to an approximate elevation of 108 feet MSL (about 50 feet below native/alluvial ground surface). Additionally, no ground water was encountered during past explorations (1954) advanced to an elevation of 110 feet MSL. Therefore, due to lack of ground water data above these elevations, liquefaction potential for this site is considered to be low.

7.0 CORROSIVITY

Soil samples were taken at locations and zones close to the estimated footing elevations. The collected soil samples were tested in Caltrans laboratory in accordance Caltrans Corrosion Testing Methods for corrosion potential. The test results are given in Table 5. The test results indicate that the soil at the site is not considered to be corrosive. Caltrans currently defines a corrosive area as an area where the soil and/or water contains more than 500 PPM of chlorides, more than 2000 PPM of sulfates, and a minimum resistivity of less than 1000 ohm-centimeters or has a pH of 5.5 or less.

Table 5 - Corrosion Test Results

Boring	Sample Depth (ft.)	Sample # Fill (F) /Native (N)	Soil Type	Wall #	pH	Minimum Resistivity* (ohm-cm)	Estimated Life (Years)
A-08-001	0-20	S-1 (F+N)	Bulk	1190	7.96	3900	44
A-08-002	35-36.5	S-10 N	CL	1190	7.48	2400	36
A-08-003	25-26.5	S-8 F	SC	1190	7.98	2000	33
A-08-004	25-26.5	S-8 N	CL	1191	7.62	1800	32
A-08-005	1-8	S-1 F	SM	1191	8.31	4600	47
A-08-007	15-16.5	S-5 F	CL-ML	1191	7.87	2200	34

Note: For corrosion definitions refer to "Memo to Designers" 3-1.

- The Corrosion Technology Branch policy states that if the minimum resistivity is greater than 1000 ohm-cm the area is considered to be non-corrosive and sulfate and chloride contents are not tested (NT).

8.0 FOUNDATION RECOMMENDATIONS

Listed in Table 2, is a summary of the proposed walls. The proposed wall locations, foundation types, sound wall heights, retaining wall heights and pile lengths are outlined in Appendix A. The footing widths and required ultimate bearing capacities are obtained from the Standard Drawings, Table-1 of File No. xs14-220e.

Lateral active/passive earth pressures for the proposed retaining walls are provided in Section 8.2. Potential settlements for the ramp widening and retaining walls is discussed in Sections 8.3.

8.1 Bearing Capacity

8.1.1 Type 1SWB

Allowable bearing capacity of the retaining wall footings was calculated using Terzaghi's equation with a friction angle and cohesive values developed from the soil profiles based on laboratory test results.

Based on our calculations, the on-site soils meet the bearing capacity requirements as shown in the Standard Plans and in Table 6, to support the proposed walls. It should be noted that remedial grading/inspection would be needed prior to construction. Please refer to section 9.0 "Earthwork"

Table 6
Retaining Walls 1190 and 1191 - Recommended Spread Footing Data
(Assuming adequate ground improvement achieved)

Design Height of Wall (feet) (Maximum)	Bottom of Footing Elevation (feet)	Minimum Footing Width (feet)	Recommended Bearing Limits	
			WSD Method[1]	LFD Method
			Allowable Bearing Capacity (q_{all}), ksf	Nominal Soil Bearing Resistance (q_n), ksf
10	See Table 2	8.75	2.0	NA
12	See Table 2	9.75	2.2	NA
14	See Table 2	10.75	2.4	NA
16	See Table 2	12.0	2.7	NA
18	See Table 2	13.0	3	NA
20	See Table 2	14.25	3.3	NA
22	See Table 2	15.25	3.8	NA
24	See Table 2	16.5	4.0	NA

Notes:
1. Working Stress Design (WSD): The Maximum Contact Pressure, (q_{max}), is not to exceed the recommended Allowable Soil Bearing Pressure, (q_{all}).

Retaining wall spread footings should be founded on competent existing Embankment / Native fill soils. Exposed soils at the bottom of the footing excavation shall be competent, unyielding subgrade approved by a Caltrans RE representative. In addition, a minimum horizontal distance of 4 feet measured from the top of the retaining wall footings should be maintained between the near face of the footing and the face of the finished slope. Finished slopes in front of the retaining walls must be 1:2 (Vertical: Horizontal) or flatter.

8.1.2 Type 736S/SV Barrier

For the Type 736S/SV Barrier, the soils encountered during our investigation have the capacity to support the proposed structures from a geotechnical point of view. For this type of footing foundation, assume a $\emptyset = 25°$ for a case 1, and a $\emptyset = 30°$ for the case 2, as shown in Standard Plan drawing B15-8.

The Structural Engineer (SE) might have cases requiring modifications to the above-standard designs. In this case, the SE's recommendations supersede.

8.1.3 CIDH Foundations

30-inch diameter CIDH piles are proposed to support the walls where the soundwall bridges over the PUC. The service design loads for these piles are 100 and 110 Kips (200 & 220 K nominal) for walls 1191 and 1190 respectively. These tip elevations satisfy the axial demand loads only, based on the frictional capacity of the pile.

As previously mentioned, the proposed Tieback system as described in section 8.1.4 "is proposed to resist all lateral design loading as a result of the fill placement above the PUC". Given the proposed wall design, no lateral analysis for the CIDH piles was performed.

Table No. 7- CIDH Pile Data Table

Location	Pile Diameter (Inches)	Design Load (Kip)	Nominal Resistance		Cut off Elevation (ft)	Design Pile Tip Elevation (ft)	Specified Pile Tip Elevation (ft)
Over Leonis St. Undercrossing			Compression (Kip)	Tension (Kip)			
East side (1191)	30	100	200	N/A	169.01	131.01	131.01
West side (1190)	30	110	220	N/A	166.0	124.0	124.0

8.1.4 Tieback wall design

Based on schematics provided to our office from Structural Design, the tiebacks will be applied at approximately five (5) feet below the top of the wall, with a 10° degree inclination. The maximum height of the wall is approximately 15 feet. The design load is 60 Kips, the Lock off load is 45

Kips and the maximum test load is 90 Kips. The above implies that following the lock off, the wall will be allowed to move to develop the required 60 Kip design load.

Final design of the bonded length is the responsibility of the contractor and is verified by load-testing of each anchor. The minimum unbonded length is 15 feet as per Section 5.76 of the BDS.

Pressure grouting in cohesionless soils significantly increases the normal stress acting on the grout body, in increasing confinement and the size of the annuls.

Post grouting increases the capacity in cohesive soils, by increasing the radial stress acting on the grout body. The increase according to FHWA publications could vary between 10 and 50 % per phase of post grouting. Having mentioned that, extreme care should be exercised by the contractor during the construction and tensioning of the tiebacks, to avoid damage to the PUC.

8.2 Lateral Active/Passive Earth Pressures

If retaining walls are free to move laterally at the top, an **active lateral** earth pressure of 43 pounds per square foot (PSF) per foot of depth is recommended. This active lateral earth pressure was calculated using an active earth pressure coefficient of Ka = 0.33 and a soil unit weight of γ =130 pounds per cubic foot (PCF). A traffic surcharge of 240 PSF should be added in the case of active pressures for the Retaining Walls.

Applied lateral loads may be resisted by passive earth pressures acting against the sides of the wall footings. The sliding resistance along the bottom of abutment or retaining wall footings may be based on an allowable coefficient of friction of 0.4 The recommended allowable **passive resistance** value for footings on compacted fill slopes is 182 PSF per foot of depth. This passive lateral earth pressure was calculated using a passive earth pressure coefficient of Kp = 1.4 and a soil unit weight of γ =130 pounds per cubic foot. Additionally, as recommended by the BDS Section 4.4.1.4 " The resistance due to the passive earth pressure of embankment in front of the footing shall be neglected to a minimum depth equal to three (3) feet....". For walls on level ground the Passive earth coefficient could be increased to Kp=3.4, with allowable resistance of 400 PSF per foot of depth, these values could be used if the horizontal surface is confined with asphalt or concrete pavement.

The above specified earth pressure parameters do not include surcharge or hydrostatic water pressures. These parameters should be used only when adequate drainage in accordance with Caltrans Standard Plans B0-3 May 2006 Edition is provided behind the wall.

8.3 Anticipated Settlement of Spread Footings

Total settlements were calculated for the proposed retaining wall footings. Total settlements were checked at several locations along the latest proposed wall alignments. Settlement parameters are basically dependent on the proposed fill depth at each location, coupled with consolidation

laboratory data obtained from soil samples retrieved from nearby drilled borings. The approximate locations and total estimated settlements for each wall are listed below.

Table No. 8
Estimated Settlements

Wall #	Approximate Station	Wall Height (Feet)	Estimated Settlement (Inches)
1190	289+70	10	0.75
1190	291+80	22	1.9
1190	292+85	22	2.48
1190	294+60	18	0.8
1191	190+00	10	0.5
1191	191+80	24	1.18
1191	193+20	18	1.8

Given the nature of the soils encountered during our investigation, anticipated settlements will occur shortly upon the application of loads.

As per the latest submitted elevation plans, the bottom of footing elevations follows closely the existing grades, and is stepped in approximately two-foot vertical increments. We recommend a deferential settlement of 0.5 inch (per 100 linier feet of wall) be incorporated into the design.

For proposed utilities penetrating the walls, it is recommended that sufficient clearance between the utility line and the wall stem be provided to allow for wall settlement, without damaging the utility. We recommend a clearance distance of 4 to 6 inches, between the utility and the perimeter of the retaining wall outlet be provided on top of the utility. A filter fabric or flexible membrane should also be provided between the utility and the wall stem to act as a barrier and retain the backfill soil behind the wall.

8.4 Slope Stability

The majority of the proposed retaining walls are founded on existing sloped ground. Slope stability issues related to the Type 1 retaining walls and associated fill embankment were evaluated using the computer program SLOPE W for static and pseudo static conditions. Analysis of the proposed fill embankment indicate a static safety factor greater than 1.5 and for static conditions, and greater than 1.1 for pseudo static conditions.

9.0 EARTHWORK

9.1 Required Grading Beneath Type 1SWB Foundations Placed on Level Ground . (Wall 1190 Station 289+30 to Station 292+30) (Wall 1191 Sta. 191+30 to Sta. 191+80).

Limited removal and recompaction will be required beneath the Type-1 walls placed on native (level ground areas) soil. The limits of removal should extend three (3) feet laterally outside and

beyond the footprint of the footing. The depth of removal should extend five (5) feet below the bottom of the footing. The exposed native soil should then be inspected, probed, and approved by a geotechnical representative of our office. All soft areas should be removed, and associated areas be stabilized prior to backfill. The bottom of the excavation should be scarified, moisture-conditioned, and recompacted prior to the placement of any fill. The backfill material should be recompacted to 95% relative compaction.

9.2 Inspection of Type 1SWB Foundations Subgrade Placed On Slopes.

No specific removal requirements will be required from Type 1 walls placed on slopes, however, exposed bottoms on which the foundations will be placed should be surface compacted to 95%, inspected and approved by a geotechnical representative of our office. If encountered, all soft soils should be removed to a competent base, moisture-conditioned, and recompacted to 95% relative compaction prior to construction.

9.3 Backfill behind the retaining walls.

All areas to receive fill should be cleared and grubbed from vegetation and trash. The clearing and grubbing should be in accordance to the latest edition Section 16 of the Standard Specifications. The import soil should be granular, free-draining material with an Expansion Index of less than 50 and/or a Sand Equivalent of 20 or more. The fill should be benched into the existing slopes per section 19-6.01 (Placing). Structural backfill to be placed behind the retaining walls should conform to Section 19 "Earthwork" of the latest Standard Specifications edition.

For the backfill behind the Tieback walls, it is recommended that the Structural Engineer provide specific requirements as to the sequence of wall construction fill placement and installation of the tieback tie rods.

10.0 CONSTRUCTION CONSIDERATIONS

1. Excavation of native soils as described in section 9.1 may be removed using conventional excavators and scraper and ripper equipment.

2. Temporary slopes during construction may be no steeper than 1:1 (Vertical: Horizontal). If any temporary slopes need to be steeper than 1:1, a temporary shoring system must be used and devised by the Contractor. The recommended lateral earth pressures acting against cantilevered walls will be acting in a triangular shape. The earth pressures are based on average soil conditions and are applicable for excavations of up to 15 feet in depth. Any live or dead loads within a 1:1 plane projected from the bottom of the shoring must be added to the given active earth pressures.

3. The new embankment fill should be benched into the existing fill slope. Fill should be placed in conformance with Sections 19-6.01 (Placing) and 19-6.02 (Compacting) of the latest Standard Specifications.

4. Recommendations contained in this report are based on specific project information regarding design loads, structure type and support locations that have been provided by the Office of Structure Design. The final construction plans and specifications should be submitted to the Office of Geotechnical Design South 1 Branch B to confirm that the general intents of the recommendations contained in this report have been incorporated into the final construction documents.

5. It is imperative that our office/RE representative be contacted to inspect and approve the bottoms of the required over excavation areas as described in section 9.1 and 9.2.

6. It is recommended that a representative of our office witness the drilling and installation of one CIDH pile foundation, it is also recommended that these footings be drilled and poured on the same day. All construction procedures must be carried out in accordance to Section 49-4 of the Standard Specifications.

7. Extreme care should be exercised during drilling and grouting of the tiebacks over the PUC. Close monitoring of the PUC as well as any nearby utilities is strongly recommended.

8. We recommend that specific wall construction; fill placement and pre/post tension procedures and order of work recommendations, for the tieback wall is specified in the Special Provisions as well as in the construction plans. It is recommended that our office review the plans and specifications before they are finalized.

If you have any questions, please contact Nadeem Srour at (213) 620-2377 or Sam Sukiasian at (213) 620-2135 .

Prepared by: 4/19/10

REGISTERED PROFESSIONAL ENGINEER
NADEEM SROUR
No. 2801
Exp. 12/31/11
GEOTECHNICAL
STATE OF CALIFORNIA

Nadeem Srour, G.E.
Transportation Engineer
Office of Geotechnical Design South 1
Branch B

Reviewed by: 4/19/10

FOR SAM SUKIASIAN, G.E.
Senior Transportation Engineer
Office of Geotechnical Design South 1
Branch B

c.c. (2) Traci Menard, Structural Design, Sacramento
Steve Pham, District 7 Design
OGDS-1-Sacramento;
GS File- Sacramento;
OGDS-1- Los Angeles.

REFERENCES

1. Caltrans 1954, LA-167-A, Leonis St. PED UC & Storm Drain Log of Test Borings, Bridge # 53-990.

2. California Geologic Survey (CGS), 2002, Probabilistic Seismic Hazard Assessment Maps.

3. California Geological Survey (CGS), 1997, Fault Rupture Hazard Zones in California, Special Public 42.

4. Mualchin, L., 1996, A Technical Report to accompany the Caltrans California Seismic Hazard Map 1996 (Based on Maximum Credible Earthquakes), Caltrans, 7/1996.

5. Sadigh, K, Chang, C.Y., Egan, J.A., Makdisi, F. and Youngs, R.R., 1997, Attenuation Relationships for Shallow Crustal Earthquake Based on California Strong Motion Data, Seismological Research Letters, Vol. 68, No.1.

Appendix A: General Layout Plan
Appendix B: Log of Test Borings
Appendix C: Laboratory Test Results

Appendix A
General Layout Plans

NOTE: FOR ACCURATE RIGHT OF WAY AND ACCESS DATA,
CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	710	22.5/22.7		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

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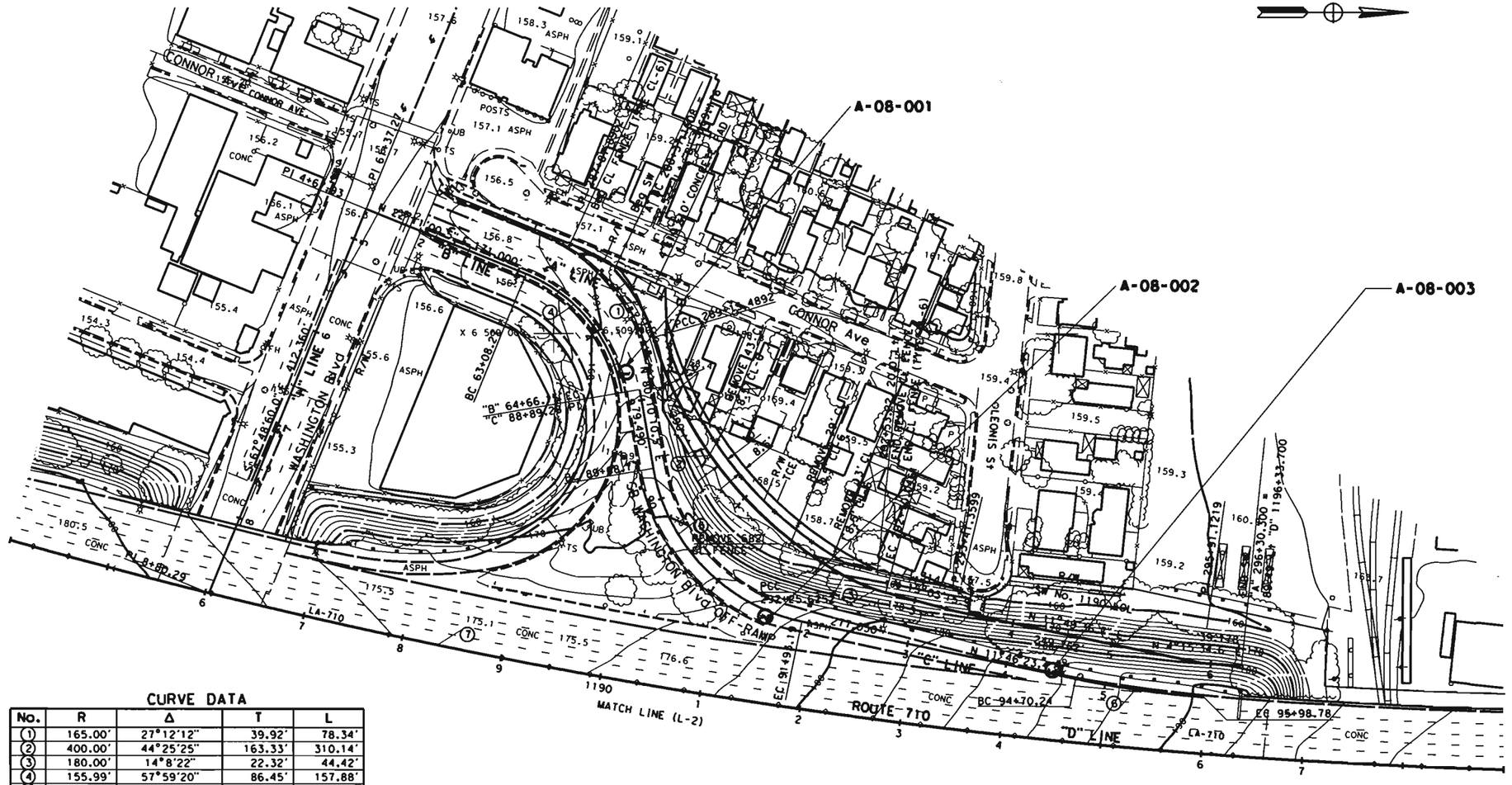
REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — CIVIL — STATE OF CALIFORNIA



LAYOUT
SCALE 1:50
L-1

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
FUNCTIONAL SUPERVISOR
CALCULATED-DESIGNED BY STEVE PHAM
CHECKED BY
REVISED BY
DATE REVISED
LAST REVISION 10-10-09
DATE PLOTTED => 90ATE
TIME PLOTTED => 97IME

BORDER LAST REVISED 4/11/2008
RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3
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DGN FILE => %REQUEST
CU 07247
EA 002341

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NOTE: FOR ACCURATE RIGHT OF WAY AND ACCESS DATA,
CONTACT RIGHT OF WAY ENGINEERING AT THE DISTRICT OFFICE.

Dist	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
07	LA	710	22.5/22.7		

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — CIVIL — STATE OF CALIFORNIA

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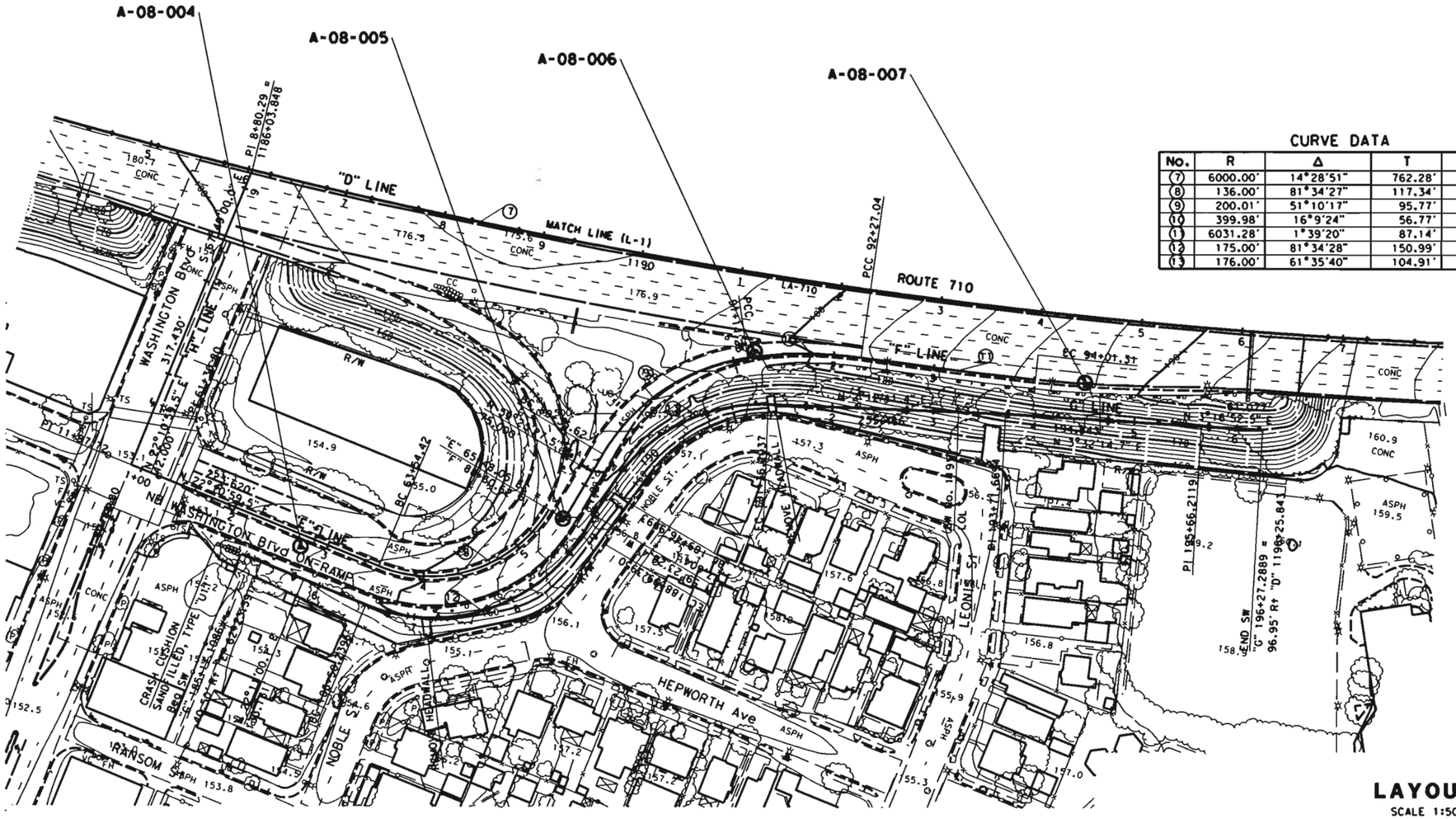

CURVE DATA

No.	R	Δ	T	L
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(8)	136.00'	81°34'27"	117.34'	193.63'
(9)	200.01'	51°10'17"	95.77'	178.63'
(10)	399.98'	16°9'24"	56.77'	112.79'
(11)	6031.28'	1°39'20"	87.14'	174.26'
(12)	175.00'	81°34'28"	150.99'	249.16'
(13)	176.00'	61°35'40"	104.91'	189.20'

LAYOUT
SCALE 1:50

L-2

CALCULATED-DESIGNED BY	CHECKED BY	REVISED BY	DATE REVISED
STEVE PHAM			

FUNCTIONAL SUPERVISOR

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

LAST REVISION 10-18-09 — DATE PLOTTED => ROUTE — TIME PLOTTED => RTIME

BORDER LAST REVISED 3/1/2007 | RELATIVE BORDER SCALE IS IN INCHES 0 1 2 3 | USERNAME => &USER DGN FILE => &REQUEST | CU 07247 | EA 002341

700234ea002 NO REF.dgn 4/19/2010 12:07:39 PM

Appendix B
Log of Test Borings

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	710			

REGIS

DRAFT

REGISTERED PROFESSIONAL ENGINEER
Nadeem Srour
No. C57648
Exp. 12-31-09
CIVIL
STATE OF CALIFORNIA

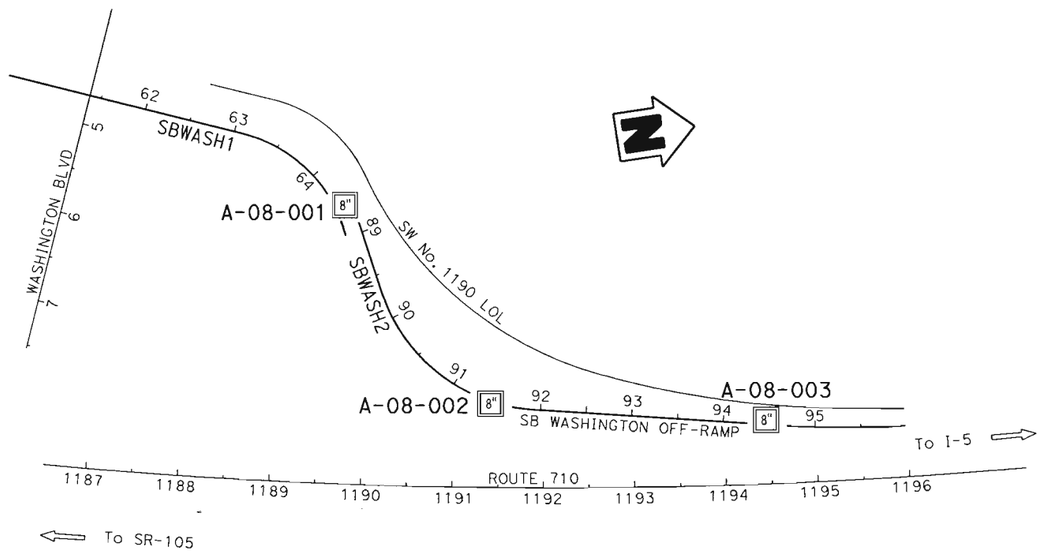
PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging; Classification; & Presentation Manual (June 2007).

BENCH MARK

#CP1114
SET PK NAIL @ GORE AREA OF SB 710 FWY
OFF-RAMP TO WASHINGTON BLVD; 15.5' N/O AC EDGE.
N 1824678.291
E 6509291.942
ELEV 176.93'



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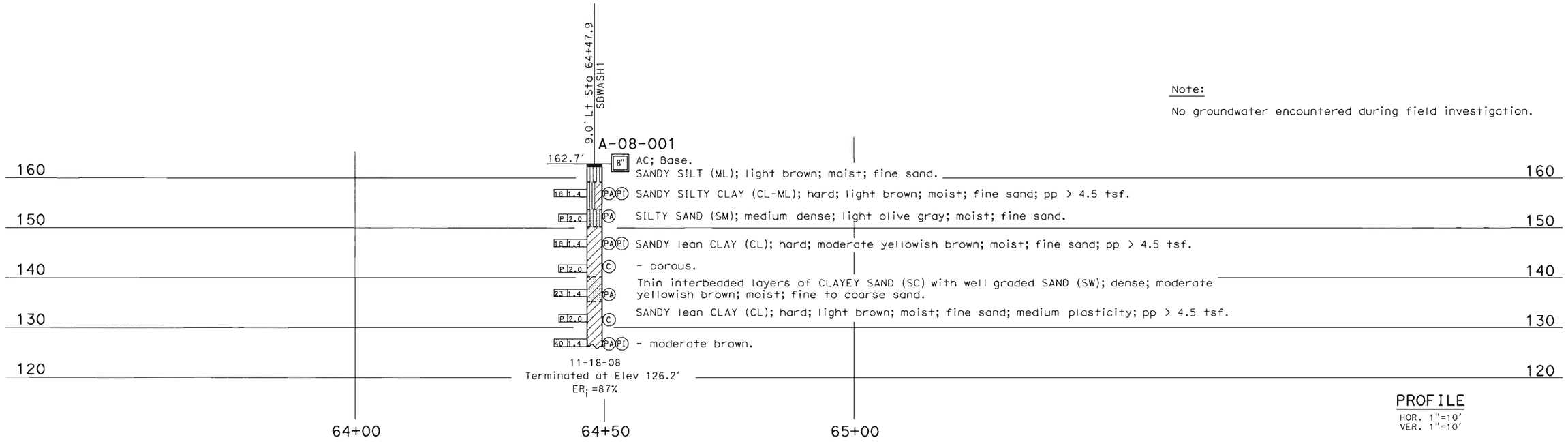

Note:

No groundwater encountered during field investigation.

PROFILE
HOR. 1"=10'
VER. 1"=10'

ENGINEERING SERVICES	GEOTECHNICAL SERVICES	STATE OF CALIFORNIA	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	SOUND WALL NO. 1190
FUNCTIONAL SUPERVISOR	DRAWN BY: W. Tang 08/09	DEPARTMENT OF TRANSPORTATION	DESIGN BRANCH	53E0136	
NAME: S. Sukiasian	CHECKED BY: Q. Liao	FIELD INVESTIGATION BY: N. Srour		POST MILES 22.5	LOG OF TEST BORINGS 1 OF 4
OGS CIVIL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3	CU 07 EA 002341		DISREGARD PRINTS BEARING EARLIER REVISION DATES	REVISION DATES 03-30-09 03-24-09 10-23-09 01-20-10 SHEET 19 OF 22

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USERNAME => scholdo DATE PLOTTED => 15-APR-2010 TIME PLOTTED => 13:05

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	710			

REG -09

DRAFT

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER
Nadeem Srour
No. C57648
Exp. 12-31-09
CIVIL
STATE OF CALIFORNIA

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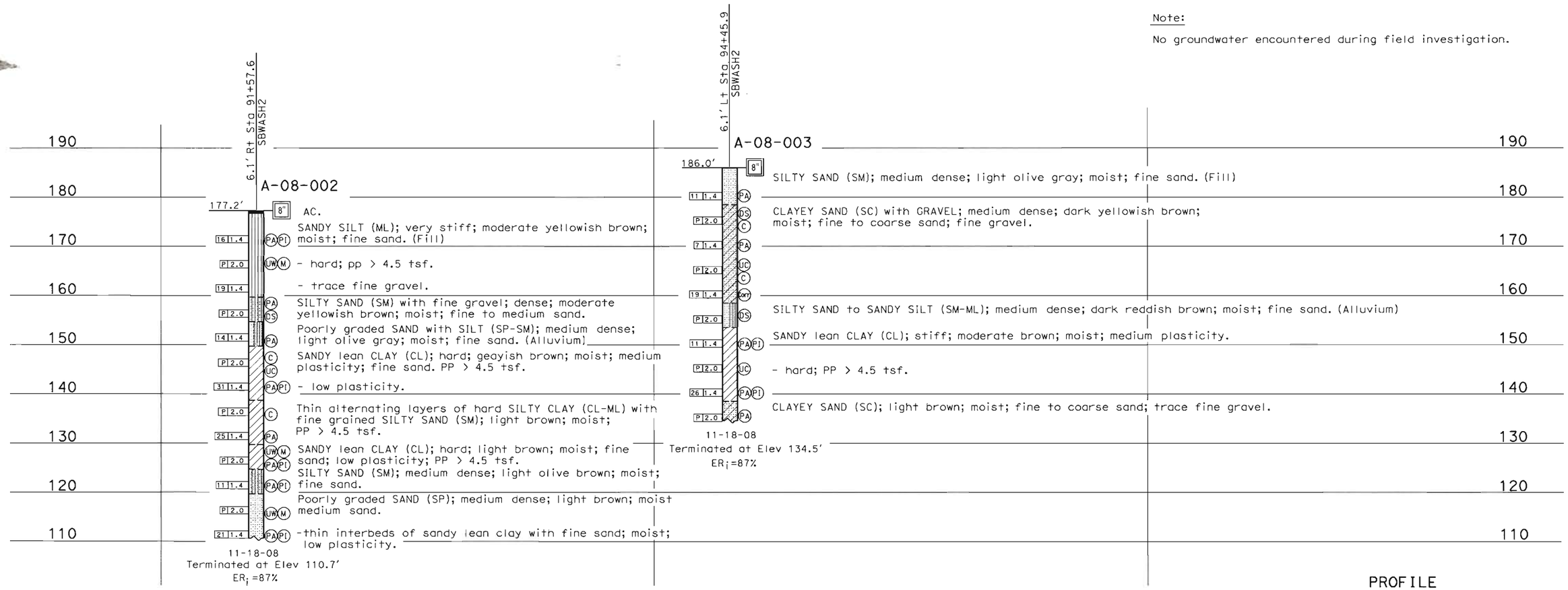
This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging; Classification; & Presentation Manual (June 2007).

FOR PLAN VIEW; SEE
"LOG OF TEST BORINGS 1 OF 4"

Note:

No groundwater encountered during field investigation.



PROFILE
HOR. 1"=30'
VER. 1"=10'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	SOUND WALL NO. 1190
FUNCTIONAL SUPERVISOR	DRAWN BY: W. Tang 08/09		FIELD INVESTIGATION BY:		DESIGN BRANCH	53E0136	
NAME: S. Sukiasian	CHECKED BY: Q. Liao		N. Srour			POST MILES 22.5	LOG OF TEST BORINGS 2 OF 4

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

CU 07
EA 002341

DISREGARD PRINTS BEARING EARLIER REVISION DATES →

REVISION DATES: 09-24-09 | 03-24-09 | 10-23-09 | 01-20-10

SHEET 20 OF 22

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DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	710			

REC 5-09

DRAFT

PLANS APPROVAL DATE

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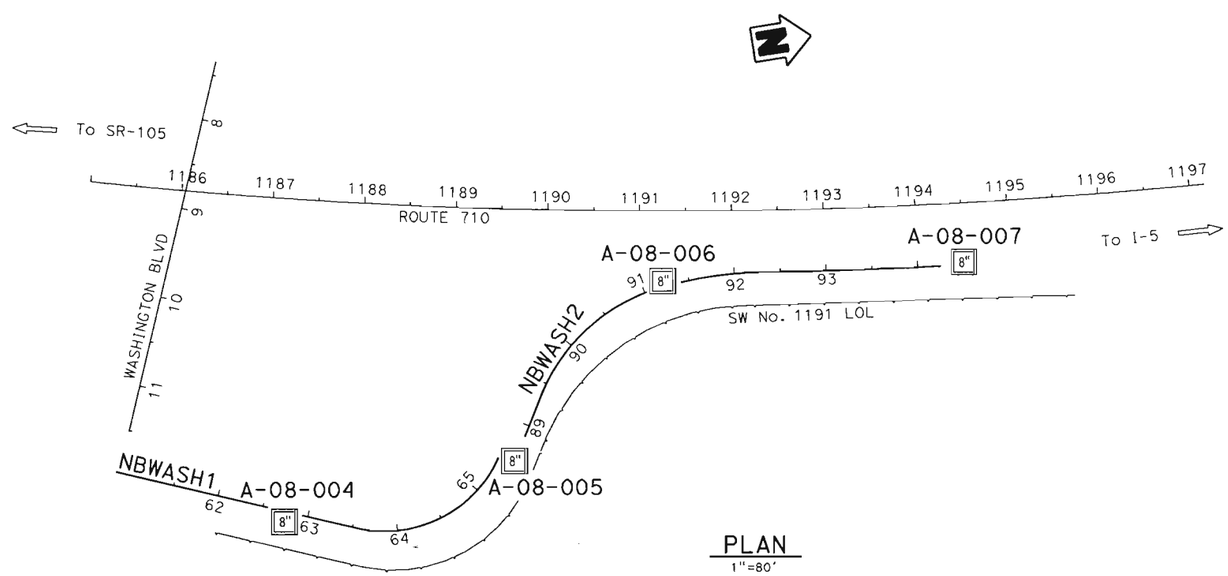
REGISTERED PROFESSIONAL ENGINEER
Nadeem Srour
No. C57648
Exp. 12-31-09
CIVIL
STATE OF CALIFORNIA

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging; Classification; & Presentation Manual (June 2007).

BENCH MARK

#PRHV 1303
SET PK NAIL AT NB 710 FWY SHOULDER
AT NB 710 WASHINGTON BLVD ON-RAMP
N 1824624.842
E 6509423.175
Elev 178.81'



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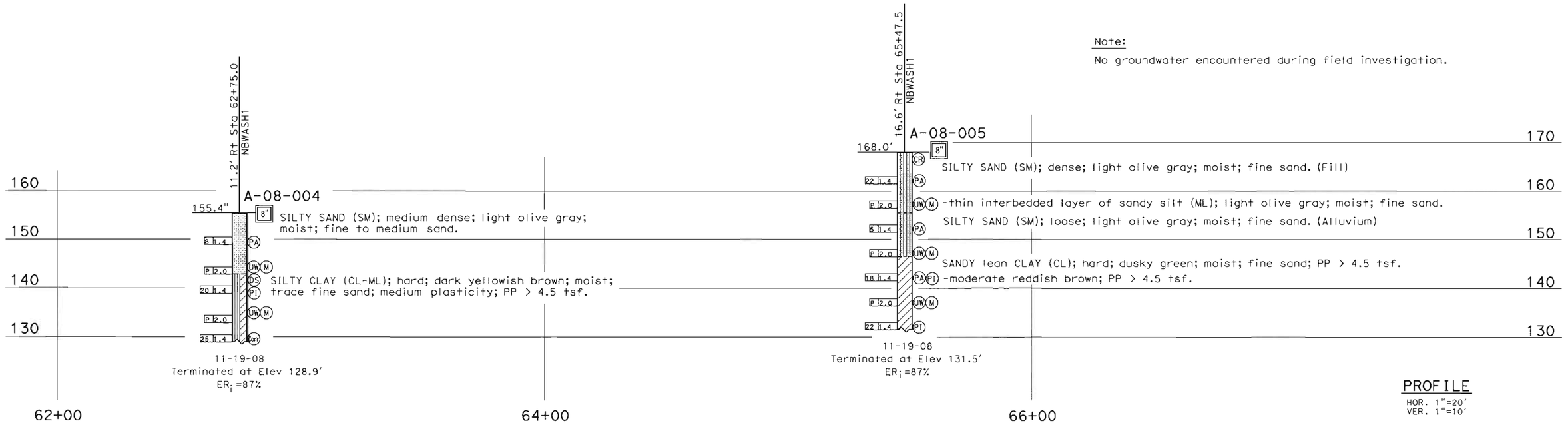

Note:
No groundwater encountered during field investigation.

PROFILE
HOR. 1"=20'
VER. 1"=10'

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FUNCTIONAL SUPERVISOR	DRAWN BY: W. Tang 08/09	FIELD INVESTIGATION BY:		DESIGN BRANCH	POST MILES 22.5	LOG OF TEST BORINGS 1 OF 4
NAME: S. Sukiasian	CHECKED BY: Q. Liao	N. Srour				
OGS CIVIL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3		CU 07 EA 002341	DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES 01-26-10	SHEET 19 OF 22

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USERNAME => schoi1dd DATE PLOTTED => 15-APR-2010 TIME PLOTTED => 12:48

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
07	LA	710			

REGIST

DRAFT

REGISTERED PROFESSIONAL ENGINEER
Nadeem Srour
No C57648
Exp. 12-31-09
CIVIL
STATE OF CALIFORNIA

PLANS APPROVAL DATE

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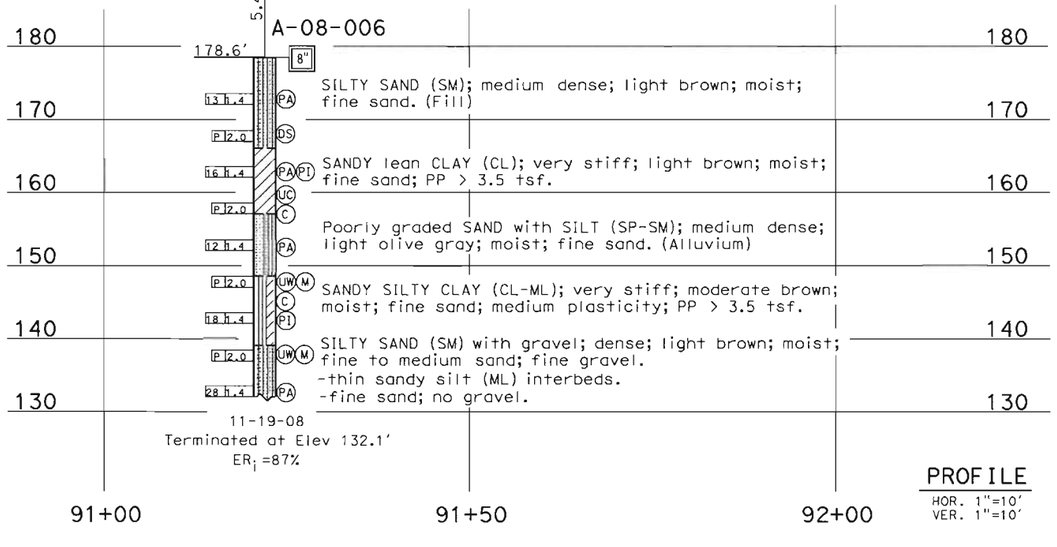
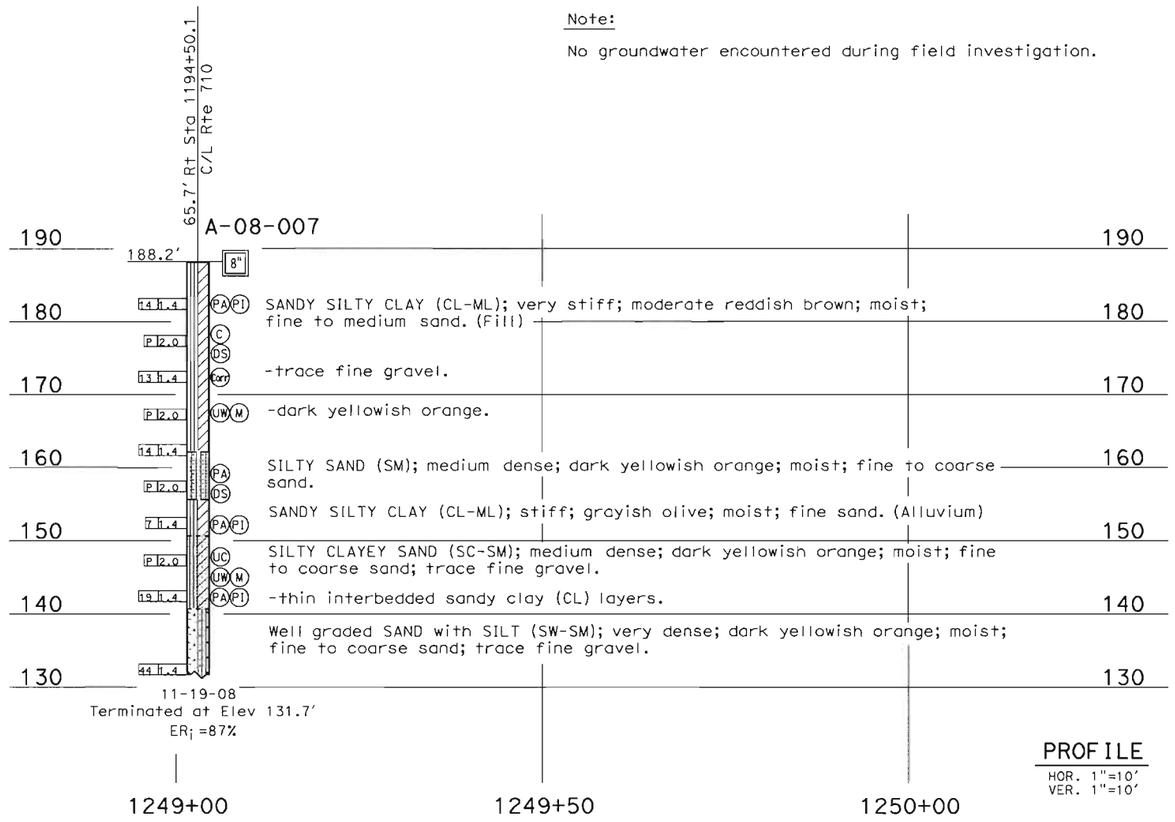
This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (June 2007).

FOR PLAN VIEW, SEE
"LOG OF TEST BORINGS 1 OF 4"

Note:

No groundwater encountered during field investigation.





ENGINEERING SERVICES	GEOTECHNICAL SERVICES		STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	SOUND WALL NO. 1191
FUNCTIONAL SUPERVISOR	DRAWN BY: W. Tang 08/09	FIELD INVESTIGATION BY:		DESIGN BRANCH	53E0137	LOG OF TEST BORINGS 2 OF 4
NAME: S. Sukiasian	CHECKED BY: Q. Liao	N. Srour			POST MILES 22.5	
OGS CIVIL LOG OF TEST BORINGS SHEET	ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3		CU 07 EA 002341		DISREGARD PRINTS BEARING EARLIER REVISION DATES →	REVISION DATES 08-24-09 01-24-09 12-15-09 01-26-10 01-26-10 SHEET 20 OF 22

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Appendix C
Laboratory Test Results

Summary of Laboratory Results

Boring Sample #	Depth (ft.)	γ_d, lb/ft^3	Moisture %	Soil Type	Fill (F) or Native (N)	Atterburg LL/PL/PI	Direct Shear (Ø°,C psf)	Unconfined Compression (ksf)
A-08-001 S-2	5.0-6.5	N/A	N/A	CL	F	26/19/7		
S-5	15-16.5	N/A	N/A	CL	N	27/18/9		
S-7	21-21.5	108.16	15.03	CL	N			
S-10	31-31.5	108.33	18.96	CL	N			
S-11	35-36.5	N/A	N/A	CL	N	32/18/14		
A-08-002 S-2	5-6.5	N/A	N/A	ML	F	24/23/1		
S-4	11-11.5	120.7	14.2	ML	F			
S-6	21-21.5	122.69	10.08	SM	F		37°, NA	
S-8	30.5-31	116.71	15.4	CL	N			
S-9	31-31.5	115.8	14.7	CL	N			5.9
S-10	35-36.5	N/A	N/A	CL	N	26/16/10		
S-12	41-41.5	104.39	11.48	CL	N			
S-14	50.5-51	126.9	12.7	CL	N			
S-15	51-51.5	N/A	N/A	CL	N	33/18/15		
S-16	55-56.5	N/A	N/A	SM	N	23/22/1		
S-18	61-61.5	103.2	1.6	SP	N			
S-19	65-66.5	N/A	N/A	CL	N	32/22/10		
A-08-003 S-3	10.5-11	120.5	11.76	SC	F		35°, 750	
S-4	11-11.5	115.34	14.39	SC	F			
S-7	21-21.5	111.58	14.11	SC	F			
S-10	31-31.5	105.55	13.68	SM-ML	N		37°, 660	
S-11	35-36.5	N/A	N/A	CL	N	27/17/10		
S-12	40.5-41	107	19.7	CL	N			2.5
S-14	45-46.5	N/A	N/A	CL	N	34/19/15		
A-08-004 S-3	10.5-11	87.8	3.6	SM	N			
S-4	11-11.5	92.53	3.62	SM	N		45°, 450	
S-5	15-16.5	N/A	N/A	CL	N	39/22/17		
S-7	21-21.5	117.4	11.9	CL	N			
A-08-005 S-4	11-11.5	103.7	10.8	ML	F			
S-7	21-21.5	103.6	5.8	SM	N			
S-8	25-26.5	N/A	N/A	CL	N	35/21/14		
S-10	31-31.5	111.3	10.8	CL	N			
S-11	35-36.5	N/A	N/A	CL	N	26/18/8		
A-08-006 S-4	11-11.5	111.2	16.22	SM	F		35°, 620	
S-5	15-16.5	N/A	N/A	CL	F	27/19/8		
S-6	20.5-21	111.1	16.81	CL	F			2.6
S-7	21-21.5	111.92	17.58	CL	F			
S-9	30.5-31	112.5	14.3	CL-ML	N			
S-10	31-31.5	114.66	15.82	CL-ML	N			
S-11	35-36.5	N/A	N/A	CL-ML	N	23/16/7		
S-13	41-41.5	105.3	4.1	SM	N			
A-08-007 S-2	5-6.5	N/A	N/A	CL-ML	F	26/19/7		
S-3	10.5-11	124.93	11.37	SM-ML	F			
S-4	11-11.5	116.51	13.38	SM-ML	F		46°, 510	

Boring Sample #	Depth (ft.)	γ_d, lb/ft^3	Moisture %	Soil Type	Fill (F) or Native (N)	Atterburg LL/PL/PI	Direct Shear (Ø°,C psf)	Unconfined Compression (ksf)
S-7	21-21.5	112.8	6.9	SM-ML	F			
S-10	31-31.5	119.21	11.46	SM	F		44°, 670	
S-11	35-36.5	N/A	N/A	SM-ML	N	29/22/7		
S-12	40.5-41	112.6	9.68	SC-SM	N			1.2
S-14	45-46.5	N/A	N/A	SC-SM	N	25/16/9		
S-13	41-41.5	111.8	11	SC-SM	N			

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: Mansoor Khan, STE
Office of Design B

Attn: Steve Pham, PE
Project Engineer

Date: September 17, 2009

File: 07-LA-710 PM 2.5/22.7
Soundwall Construction
at Washington Boulevard
City of Commerce in Los
Angeles County

EA: 07-333-002341

From: **DEPARTMENT OF TRANSPORTATION**
OEECS- HAZARDOUS WASTE BRANCH, SOUTH REGION, MS 16

Subject: *PS&E Hazardous Waste Assessment*

The Office of Environmental Engineering and Corridor Studies (OEECS) is in receipt of your memorandum dated December 16, 2008 requesting a hazardous waste assessment on the subject PS&E project. The project work is located on Route 710 from Washington Boulevard to 0.4 km north of Washington Boulevard in the City of Commerce in Los Angeles County. The project proposes to construct 2,050 lineal feet of soundwalls along the edge of the shoulder of Route 710 on-ramp and off-ramp at Washington Boulevard. The soundwalls are 1,145 lineal feet along the northbound on-ramp and 906 lineal feet along the southbound off-ramp. The estimated height of the wall is 14.0-feet.

This soundwall project was included in the May 1989 list. Funding for the May 1989 list of 42 sound-walls and was established through a special lump sum that was adopted by the California Transportation Commission (CTC) in July 2000. Soundwall projects are listed according to priority number designated by the CTC. The CTC designated priority number for this project is 45.

According to the Department's noise investigation, the construction of these soundwalls will result in an average noise level reduction of 10.0 decibels (dBA). Decibel is the unit of measurement for relative sound intensity defined on a logarithmic scale and measured on the A scale of a standard Sound Level Meter. The A scale most nearly approximates the response of the human ear to sound. For example, while a decrease of 2 or 3 dBA may be hardly noticeable, a decrease of 10 dBA reduces the apparent noise level to half.

On June 11, 2009 an environmental task order (Task Order No. 07A2212-13) was issued to WorleyParsons (Consultant), Caltrans environmental consultant to conduct an aerially deposited lead (ADL) site investigation (SI) at the subject soundwall location. The environmental fieldwork was performed on June 18 and 19 of 2009. The contracted tasks with the Consultant involved

preparation of a health and safety plan, site reconnaissance, boring locations marking, utility clearance, field drilling, soil sample collection, laboratory analysis of the collected soil samples, data validation of the laboratory results, and preparation of the draft and final ADL Site Investigation Data Report. Caltrans staff is responsible in performing the regression and statistical analysis and to provide ADL soil classifications/waste management based on the final/validated laboratory data provided by the Consultant. Caltrans' ADL soil classification calculation will be provided as attachments to the Consultant's ADL Site Investigation Data Report.

The site investigation primarily focused on ADL deposited on unpaved roadway surface from historical leaded gasoline emissions of motor vehicles. Lead in excess of California hazardous waste criteria is found in soil next to older and/or heavily traveled highways in California due to historical leaded gasoline use. The SI focuses on soil sample collection replicating the proposed Soundwall excavation depths within the said wall alignment.

In accordance with the approved task order, soil samples were originally proposed to be collected from surface to a maximum depth of 17 feet below ground surface (bgs) at various intervals. However, because of field condition, Boring 1053-104 was advanced only to 3.0 feet bgs due to mechanical equipment refusal (this boring was originally proposed to advance to 5.0 feet bgs).

The proposed analytical event consisted of Total Threshold Limit Concentration (TTLC) for lead, Soluble Threshold Limit Concentration (STLC) for lead, based on the standard Waste Extraction Test (WET) and using De-Ionized water (DI-WET), Toxicity Characteristic Leaching Procedures (TCLP), Title 22 metals, and soil pH testing. Field and laboratory quality assurance and quality control (QA/QC) and data validation were conducted by the Consultant to ensure that the samples were acceptable in accordance with the regulated standards.

The Data Regression and Statistical Analysis performed by Caltrans staff are based on the EPA SW-846 guidance for 90% and 95% upper confidence level (UCL) in order to determine whether the soil is (1) non-hazardous and can be reuse on site and/or relinquished to the contractor without restriction or (2) the soil can be reused via invoking the California Department of Toxic Substances Control (DTSC) Lead Variance or (3) dispose of as either California and/or Federal hazardous waste at a permitted disposal facility pursuant to Section 25143, Chapter 6.5, Division 20 of the Health and Safety Code (HSC). The tabulated results are shown on the below table:

Direction	Layer	UCL %	TTLC (mg/kg)	STLC (mg/l)	Di-Wet (mg/l)	TCLP (mg/l)
NB	0-17 ft	95	759.86	110.96	1.30	3.75
NB	0-17 ft	90	687.87	101.11	1.10	3.46
SB	0-17 ft	95	231.32	74.71	0.41	<5.0
SB	0-17 ft	90	203.03	64.66	0.37	<5.0

Recommendations:

According to the information provided by your office, this project will require imported fill, and of-site disposal will not be required since there will not be any excess/surplus soil generated by the project.

Northbound and Southbound Soundwalls:

The generated excavated material is classified as *Structure/Roadway Excavation Type Y-1* and can be re-used as fill material on the job site in accordance with the DTSC Lead Variance.

ADL Soil Classification:

Type Y-1: This material is hazardous waste regulated by the State of California and can be reused as permitted by the California Department of Toxic Substances Control (DTSC) issued lead variance (July 2009) provided that the lead contaminated soil is placed a minimum five (5) feet above the maximum groundwater table and covered with at least one (1) foot of non-hazardous soil (sift cover) and/or pavement structural section. ***Excess Type Y-1 soil shall be treated as Type Z-2 and shall be disposed at a permitted Class I hazardous waste disposal facility within the State of California***.

Type Z-2: This material is hazardous waste regulated by the State of California and shall be excavated, transported, and disposed of at a permitted Class I disposal facility within the State of California.

With the exception of lead, none of the Title 22 metals tested at or above their respective total lead concentration (TTLC), nor were they detected at or above ten (10) times their respective soluble lead concentration (STLC).

The Contractor is required to prepare a project-specific Lead Compliance Plan (LCP) to prevent or minimize worker exposure to lead while handling material containing aerially deposited lead. Attention is directed to Title 8, California Code of Regulations, Section 1532.1, "Lead", for specific Cal-OSHA requirements when working with lead.

Pursuant to the DTSC Lead Variance *(http://www.dot.ca.gov/hq/env/haz/pdfs/adl/h295.pdf)*, a formal Notification shall be provided to DTSC five (5) days prior to start construction. The Notification letter shall contain conditions stipulated in the Variance (sample notification letter and requirements can be provided upon request).

For engineer's cost estimate, please refer to *http://t8web/design/contractcost/* for the unit cost in ADL soil (Type Y-1) handling. In addition, it is important to notify the Contractor that lead is present and allow preparation of a project-specific Lead Compliance Plan (LCP) and Excavation and Transportation Plan (ETP) for onsite ADL soil management as required by Title 8, California Code of Regulations, Section 1532.1(e)(2)(B) and Caltrans Standard Special Provisions (SSP).

Additionally, per our discussion with the Project Engineer on September 16, 2009, it was confirmed that the existing yellow traffic stripe and/or pavement marking will be not disturbed/impacted by the proposed soundwall construction.

In the event if the scope of work and/or soil management deviates after the issuance of this assessment, your office is required to submit a formal request for a project re-evaluation.

If you have any question, I can be reached at 213-897-3646, or contact Oscar Osorio at 213-897-0688.

Steve Chan

Steve Chan, P.E., STE
District Hazardous Waste Coordinator, South Region
Office of Environmental Engineering and Corridor Studies

Reference: *Aerially Deposited Lead Site Investigation Report, Route 710 Soundwalls Construction at Washington Boulevard in the City of Commerce in Los Angeles County PM 22.5/22.7, California, Contract No. 07A2212, EA No. 07-002341, Task Order No. 13, Prepared by WorleyParsons, August 31, 2009, ID#1053.*

Attachments: *Edited SSP S5-740 Aerially Deposited Lead*
Approved NSSP 19-900 Material Containing Aerially Deposited Lead
Regression and Statistical Analysis at 90% and 95% UCL

Northbound Soundwall Regresion and Statistical Analysis at 90% and 95% UCL

0-17' Layer Analysis

Borehole Id	Sample Depth (ft BGS)	TTLC (mg/kg)	STLC (mg/L)	Di-Wet (mg/L)	T-CLP (mg/L)
1053-106	0.0	**224.00**	**8.67**	**0.37**	
1053-106	1.0	**11.90**			
1053-106	2.0	**20.20**			
1053-106	3.0	**6.05**			
1053-106	5.0	**10.10**			
1053-106	7.5	**12.30**			
1053-106	10.0	**242.00**	**14.20**		
1053-106	13.0	**1.98**			
1053-106	17.0	**1.33**			
1053-107	0.0	**399.00**	**19.90**	**0.28**	**0.11**
1053-107	1.0	**165.00**	**11.60**	**0.26**	
1053-107	2.0	**3.49**			
1053-107	3.0	**70.50**	**3.26**		
1053-107	5.0	**81.70**	**4.29**		
1053-107	7.5	**6.40**			
1053-107	10.0	**6.23**			
1053-107	13.0	**8.29**			
1053-107	17.0	**5.91**			
1053-108	0.0	**3900.00**	**258.00**	**1.86**	**3.12**
1053-108	1.0	**453.00**	**95.90**	**0.66**	**1.29**
1053-108	2.0	**36.10**			
1053-108	3.0	**34.90**			
1053-108	5.0	**96.70**	**6.56**	**<0.100**	
1053-108	7.5	**6.46**			
1053-108	10.0	**1790.00**	**128.00**	**0.43**	**3.07**
1053-108	13.0	**332.00**	**57.40**	**<0.100**	**0.07**
1053-108	17.0	**4.71**			
1053-109	0.0	**2760.00**	**174.00**	**2.68**	**5.30**
1053-109	1.0	**786.00**	**74.50**	**1.61**	**3.52**
1053-109	2.0	**1050.00**	**26.20**	**0.37**	**0.64**
1053-109	3.0	**458.00**	**38.40**	**0.13**	**2.06**
1053-109	5.0	**44.00**			
1053-109	7.5	**19.70**			
1053-109	10.0	**220.00**	**5.05**	**0.03**	
1053-109	13.0	**5.94**			
1053-109	17.0	**9.16**			

TTLC Analysis

Number of samples, n	36.0	Max. TTLC	36.00	36.00	Max. TTLC	36.00
Mean (Average), x	369.0	3,900.0	0.11	12.48	3,900.0	0.11
Delta = RT - Mean	1,127.0					
Appropriate no. of Samples	1				< 36 Samples OK	
Standard Deviation of a Sam	823.7		0.29	14.81		0.29
Standard Deviation of the M	137.3		0.05	2.47		0.05
Variance of a Sample, S^2	678,478.0			219.44	> 369 (Mean)	
90% t-value for (n-1) sample	1.306		1.306	1.306	Need to Transform Data	1.306
90% Upper Confidence Leve	548.3		0.18	15.70		0.18
Reverse Transformation for 90%		548.3	687.87	246.49		687.87
OK, we can invoke the variance						< 1496 mg/kg
95% t-value for (n-1) sample			1.690	1.690		1.690
95% Upper Confidence Leve			0.20	16.6		0.20
Reverse Transformation for 95%						759.86
OK, depending on STLC results, we can co			2			< 1496 mg/kg

STLC Analysis

Number of samples, n	16.0	Max. STLC	16.00	16.00	Max. STLC	16.00
Mean (Average), x	57.9	258.0	0.27	6.32	258.0	0.27
Delta = RT - Mean	1,438.1					
Appropriate no. of Samples	0				< 16 Samples OK	
Standard Deviation of a Sam	73.4		0.41	4.37		0.41
Standard Deviation of the M	18.3		0.10	1.09		0.10
Variance of a Sample, S^2	5,383.2			19.10	> 57.9 (Mean)	
90% t-value for (n-1) sample	1.341		1.341	1.341	Need to Transform Data	1.341
90% Upper Confidence Leve	82.5		0.40	7.79		0.40
Reverse Transformation for 90%		82.5	101.11	60.63		101.11
OK, we can invoke the variance						< 1496 mg/kg
95% t-value for (n-1) sample			1.753	1.753		1.753
95% Upper Confidence Leve			0.44	8.2		0.44
Reverse Transformation for 95%						110.96
OK, depending on STLC results, we can co			2			< 1496 mg/kg

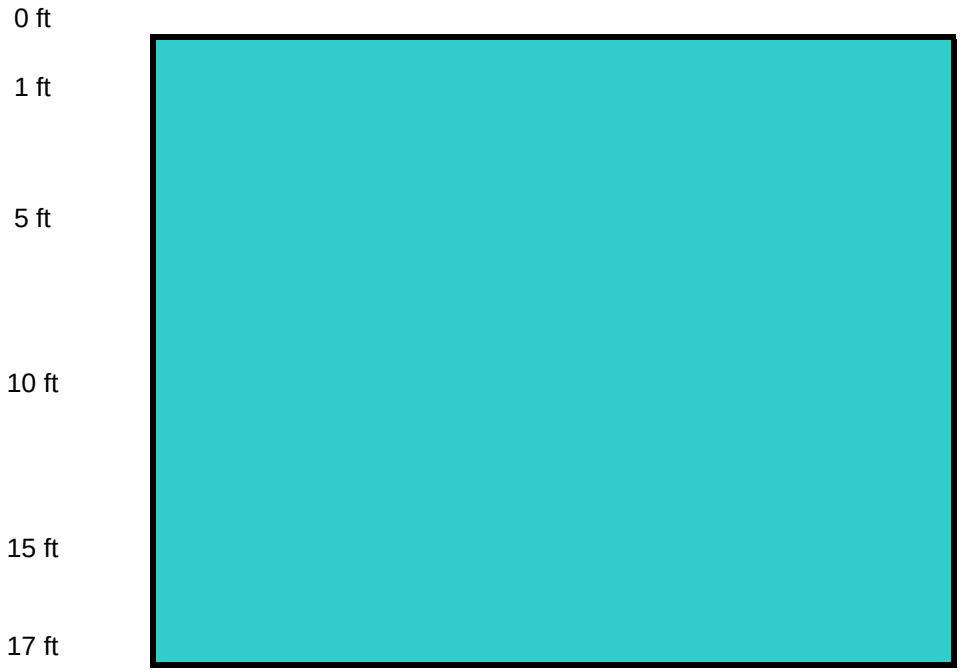
Di-Wet Analysis

Number of samples, n	11.0	Max. Di-Wet	11.00	11.00	
Mean (Average), x	0.8	2.7	0.36	0.78	
Delta = RT - Mean	1,495.2				
Appropriate no. of Samples	0				< 11 Samples OK
Standard Deviation of a Sam	0.9		0.47	0.45	
Standard Deviation of the M	0.3		0.14	0.14	
Variance of a Sample, S^2	0.7			0.21	< 0.8 (Mean)
90% t-value for (n-1) sample	1.372		1.372	1.372	Normal Dis
90% Upper Confidence Leve	1.1		0.55	0.96	
		1.1	1.41	0.93	
95% t-value for (n-1) sample	1.812		1.812	1.812	
95% Upper Confidence Leve	1.3		0.61	1.0	

TCLP Analysis

Number of samples, n	9.0	Max. TTLC	9.00	9.00	Max. TTLC	9.00
Mean (Average), x	2.1	5.3	0.48	1.30	5.3	0.48
Delta = RT - Mean	1,493.9					
Appropriate no. of Samples	0				< 9 Samples OK	
Standard Deviation of a Sam	1.8		0.49	0.71		0.49
Standard Deviation of the M	0.6		0.16	0.24		0.16
Variance of a Sample, S^2	3.1			0.51	> 2.1 (Mean)	
90% t-value for (n-1) sample	1.397		1.397	1.397	Need to Tra	1.397
90% Upper Confidence Leve	3.0		0.71	1.63		0.71
Reverse Transformation for 90%		3.0	3.46	2.65		3.46
OK, we can invoke the variance						< 1496 mg/kg
95% t-value for (n-1) sample			1.860	1.860		1.860
95% Upper Confidence Leve			0.79	1.7		0.79
Reverse Transformation for 95%						3.75
OK, depending on STLC results, we can co			2			< 1496 mg/kg

Block Diagram For NB 710 Soundwall



	Structure Excavation Type Y-1				
RESULTS					
Layer	UCL %	TTLC (mg/kg)	STLC (mg/l)	Di-wet (mg/l)	TCLP (mg/l)
0-17 Ft	90	687.87	101.11	1.10	3.46
	95	759.86	110.96	1.30	3.75

RECOMMENDATION:
All excavated material is classified as ***Structure Excavation Type Y-1***

Southbound Soundwall Regresion and Statistical Analysis at 90% and 95% UCL

0-17' Layer Analysis

Borehole Id	Sample Depth (ft BGS)	TTLC (mg/kg)	STLC (mg/L)	Di-Wet (mg/L)	T-CLP (mg/L)
1053-101	0.0	**183.00**	**17.70**	**0.36**	
1053-101	1.0	**16.20**			
1053-101	2.0	**26.50**			
1053-101	3.0	**1470.00**	**116.00**	**0.48**	**0.24**
1053-101	5.0	**118.00**	**6.14**	**0.10**	
1053-101	7.5	**1.80**			
1053-101	10.0	**3.20**			
1053-101	13.0	**1.05**			
1053-102	0.0	**9.04**			
1053-102	1.0	**5.42**			
1053-102	2.0	**7.71**			
1053-102	3.0	**11.90**			
1053-102	5.0	**33.30**			
1053-103	0.0	**119.00**	**7.33**	**0.17**	
1053-103	1.0	**6.13**			
1053-103	2.0	**6.51**			
1053-103	3.0	**6.85**			
1053-103	5.0	**9.08**			
1053-104	0.0	**52.10**	**3.87**		
1053-104	1.0	**29.00**			
1053-104	2.0	**6.82**			
1053-104	3.0	**35.50**			
1053-105	0.0	**153.00**	**6.29**	**0.24**	
1053-105	1.0	**5.62**			
1053-105	2.0	**120.00**	**4.54**		
1053-105	3.0	**18.60**			
1053-105	5.0	**1.72**			
1053-105	7.5	**1.77**			
1053-105	10.0	**1.06**			
1053-105	13.0	**4.98**			
1053-105	17.0	**4.82**			

TTLC Analysis

Number of samples, n	**31.00**	**Max. TTLC**	**31.00**	**31.00**	Max. TTLC	31
Mean (Average), x	**79.67**	**1470.00**	**0.07**	**5.62**	1470	0.07263369
Delta = RT - Mean	**1416.33**					
Appropriate no. of Samples	**0.06**				< 31 Samples OK	
Standard Deviation of a Sampl	**262.77**		**0.28**	**7.05**		0.28009935
Standard Deviation of the Mea	**47.19**		**0.05**	**1.27**		0.05030733
Variance of a Sample, S^2	**69047.85**			**49.68**	> 79.7 (Mean)	
90% t-value for (n-1) samples	**1.31**		**1.31**	**1.31**	Need to Tran	1.31041503
90% Upper Confidence Level	**141.51**		**0.14**	**7.28**		0.13855717
Reverse Transformation for 90%		**141.51**	**203.03**	**52.99**		203.027951
OK, we can invoke the variance						< 1496 mg/kg
95% t-value for (n-1) samples			**1.70**	**1.70**		1.69726085
95% Upper Confidence Level			**0.16**	**7.77**		0.15801835
Reverse Transformation for 95%						231.321482
OK, depending on STLC results, we can cor			**2.00**			< 1496 mg/kg

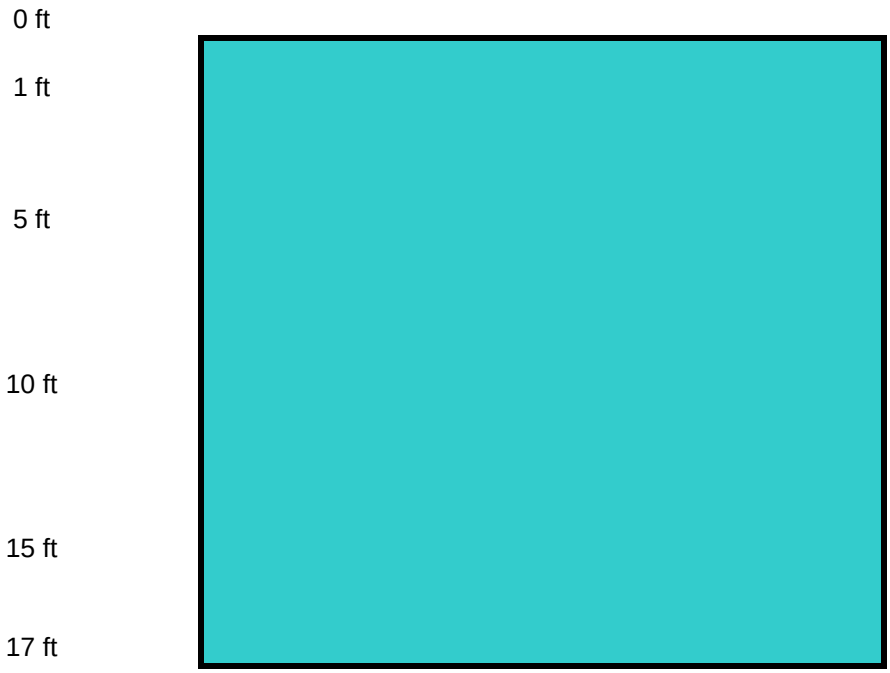
STLC Analysis

Number of samples, n	**7.00**	**Max. STLC**	**7.00**	**7.00**	Max. TTLC	7
Mean (Average), x	**23.12**	**116.00**	**0.28**	**3.82**	116	0.28099077
Delta = RT - Mean	**1472.88**					
Appropriate no. of Samples	**0.00**				< 7 Samples OK	
Standard Deviation of a Sampl	**41.22**		**0.57**	**3.15**		0.57017068
Standard Deviation of the Mea	**15.58**		**0.22**	**1.19**		0.21550426
Variance of a Sample, S^2	**1698.79**			**9.92**	> 23.1 (Mean)	
90% t-value for (n-1) samples	**1.44**		**1.44**	**1.44**	Need to Tran	1.43975575
90% Upper Confidence Level	**45.55**		**0.59**	**5.54**		0.59126427
Reverse Transformation for 90%		**45.55**	**64.66**	**30.67**		64.6596892
OK, we can invoke the variance						< 1496 mg/kg
95% t-value for (n-1) samples			**1.94**	**1.94**		1.94318027
95% Upper Confidence Level			**0.70**	**6.14**		0.6997544
Reverse Transformation for 95%						74.7074597
OK, depending on STLC results, we can cor			**2.00**			< 1496 mg/kg

Di-Wet Analysis

Number of samples, n		**5.00**	**Max. Di-wet**	**5.00**	**5.00**		
Mean (Average), x		**0.27**	**0.48**	**0.71**	**0.50**		
Delta = RT - Mean		**1495.73**					
Appropriate no. of Samples		**0.00**				< 5 Samples OK	
Standard Deviation of a Sampl		**0.15**		**0.54**	**0.15**		
Standard Deviation of the Mea		**0.07**		**0.24**	**0.07**		
Variance of a Sample, S^2		**0.02**			**0.02**	< 0.3 (Mean)	
90% t-value for (n-1) samples		**1.53**		**1.53**	**1.53**	Normal Distri	
90% Upper Confidence Level		**0.37**		**1.08**	**0.61**		
			0.38	**0.42**	**0.37**		
95% t-value for (n-1) samples		**2.13**		**2.13**	**2.13**		
95% Upper Confidence Level		**0.41**		**1.22**	**0.65**		

Block Diagram For SB 710 Soundwall



	Structure Excavation Type Y1				
RESULTS					
Layer 0-17'	UCL %	TTLC (mg/kg)	STLC (mg/l)	Di-wet (mg/l	TCLP< 5.0 mg/l
	90	203.03	64.66	0.37	
	95	231.32	74.71	0.41	

RECOMMENDATION:

All excavated material is classified as ***Structure Excavation Type Y1***